# What You Should Know About Maple Syrup

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**Fact**sheet

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Maple syrup is a distinctly North American product. Canada produces about 83% of the world's supply. Quebec produces nearly 92% of this, Ontario 4% and the Maritime Region (New Brunswick, Nova Scotia and Prince Edward Island) 4%. Maple syrup is also produced in the Northeastern United States from Minnesota to Maine and south to West Virginia.

Ontario has an estimated 1.3 million taps with an annual production of more than 1 million litres of syrup. While syrup production is important in Southern, Southwestern, Eastern, Central and North-Central areas of the province, the Waterloo-Wellington in southern Ontario and Lanark and District areas in eastern Ontario are the highest-producing areas. About 78% of Ontario's maple producers use plastic tubing systems to collect their sap, while the remainder use the more traditional bucket collection system.

## HISTORY

Long before European settlers arrived, Canada's Native peoples were making a dark sugar from the sap of maple trees. In the spring, they made a diagonal incision in the trunk and inserted a strip of bark at the lower end of the cut to serve as a spile.

The sap was collected in birchbark containers and then poured into hollowed-out logs. Rocks heated in a fire were placed in the sap to heat and evaporate it. Slowly the sap became syrup and eventually sugar.

Early settlers learned from the Aboriginals and began making maple syrup to supplement their diets. They used spiles and wooden pails to collect the sap, which was boiled in the open in iron kettles. The art was handed down from generation to generation and is now part of our heritage. Over the years, the methods and equipment have greatly improved. Today, maple syrup production flourishes on a number of Canadian farms.

The first significant innovation in maple syrup making came in the 1880s with the introduction of the forerunner to today's flue pan evaporator. In the 1950s, the tubing system for collecting sap became available. In the 1990s, smaller "health spouts" became commercially ava:' 'ble; these spouts help safeguard the health of maple trees and are being used by many maple producers. More emphasis is being placed on the production of high-quality maple products than ever before with many producers being involved in quality assurance programs. Nowadays, reverse osmosis machines can concentrate the sap before boiling, and a number of inventions utilize the steam from the evaporator to make syrup making more efficient.

## MAPLE TREES

Many species of maple are found throughout the Northern hemisphere but only two of these — the sugar maple (*Acer saccharum*) and black maple (*Acer nigrum*) — are commonly used for maple syrup production. However, sugar maple is the species most often tapped. This species may grow as tall as 30 m (100 ft) and reach a trunk diameter of 100 cm (39 in.), with a lifespan of 250 years or more. The wood of sugar maple is hard, with grey bark that is quite rough when mature. Occasionally, producers also tap red maple (*Acer rubrum*) and silver maple (*Acer saccharinum*).

## SAP INFORMATION

When the sap begins to flow in the sapwood of the tree, it is time for tapping. At this moment, the sap is about 97.5% water, 2.4% sugar and 0.1% minerals.

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A number of factors can affect the sap's rate of flow, quantity and sugar content (which can vary from 0.5%–10%), including tree species, leaf area, techniques employed, climatic conditions and tree health. Normally, sap sugar content is in the range of 2%–3%.

A hot and sunny summer with good rainfall promotes the formation of plentiful reserves of sugar. A winter in which the ground is not frozen too deeply and is gradually warmed with the approach of spring contributes to a good flow. Spring weather has an even greater effect on sap production. Nights with temperatures below the freezing point must be followed by days with thawing temperatures (up to 46°F/8°C) to make the sap flow. If the trees are frozen, it may take several days for the sap to flow, even when daytime air temperatures are well above freezing.

A maple grove in which the trees are well spaced may produce very large maples. It is important to cull and thin the sugar bush, spacing the trees to develop lots of branches. The sap from these trees is generally more plentiful and sweeter, especially when they have protection from the wind and good exposure to the sun. The best yield will be from healthy, undamaged specimens with many branches and dense foliage. These trees are favoured in thinning operations.

## TAPPING

The trees can be tapped when the temperatures approach the freezing point. This is usually between late February and mid-March, depending on the area and the annual weather pattern. Tapping for a tubing system is often done earlier than for buckets, since a properly installed tubing system is sealed and the tap-holes are less likely to dry out.

Tapping must be done carefully to obtain the most sap from each tree. A brace and bit or power-tapping drill is used to bore holes about 1 m (39 in.) above the ground, although the height has little effect on the yield. The holes are about 3.8 cm (1.5 in.) deep and either 11 mm (7/16 in.) or about 8 mm (5/16 in.) in diameter, depending on the spouts used. Trees less than 25 cm (10 in.) in diameter should not be tapped. For every 12 cm (5 in.) in diameter above 25 cm (10 in.), an additional tap can be added to a maximum of three taps/tree, provided the trees are healthy. Trees that are stressed or are in declining health should be tapped with no more than 2 taps/tree regardless of the size of the tree. Stressed trees under 30 cm (12 in.) in diameter should not be tapped.

Equipment must be clean and sanitary to help prevent the sap from spoiling. Cover buckets to keep out rainwater and debris.

## COLLECTING

The traditional method of collecting sap from buckets by hand is tedious and requires a great deal of time and labour. Because sap often deteriorates rapidly in the buckets, producers must collect the sap once a day.

More producers are using a sap collecting system where plastic spiles are inserted in the trees and connected to a system of plastic tubing. The tubing is often installed on a slope, so that the sap flows by gravity to the sap tank. This helps ensure the sap is fresh and clear when it reaches the sugarhouse. The tubing method is usually more hygienic than buckets and requires far less labour.

Vacuum pumps are often used with the tubing system. By applying suction to the trees, the yield of sap can be substantially increased when natural conditions are not conducive to good sap flow.

## EVAPORATION

Sap normally contains about 97% water. Maple syrup must contain no more than 34% water. Evaporation removes the water to transform maple sap to syrup.

A hot, steady fire is required to maintain a constant boil. Evaporation that is too slow will adversely affect the colour and flavour of the syrup. When the boiling temperature of the liquid reaches 3.94°C (7.1°F) above the boiling point of water, the syrup has reached the minimum required sugar content. This results in syrup that has a density of 66 degrees Brix. The Brix reading is a measure of sugar concentration (primarily sucrose). At this density, the syrup is less prone to spoilage and can be legally sold. Many producers aim for a somewhat higher density than this minimum. Depending on sap sugar content, 30–45 L (8–12 gal) of sap are needed to make 1 L (1 qt) of syrup. The boiling temperature of water must be checked regularly since it varies with altitude and barometric pressure. The sugar content of the syrup can be checked with instruments such as the hydrometer and refractometer.

Wood is still a very common fuel for evaporation, although many producers have converted to oil and occasionally other fuels in order to reduce labour costs.

## FILTERING AND PACKING

During evaporation, not only sugar but also minerals are concentrated in the syrup. These minerals appear as sediment known as sugar sand and must be removed by filtering. Syrup is often filtered while hot through heavy felt filters, resulting in an attractive, crystal clear product. Other producers use a filter press. With this method, hot maple syrup is forced under pressure through a series of very fine filters.

The syrup is then packed hot (85°C/185°F or more) into glass, tin or plastic containers. The hot syrup sterilizes the container and prevents the formation of mould.

## OTHER MAPLE PRODUCTS

By boiling away more of the water from maple syrup, then cooling and stirring by various methods, a number of other maple products can be created. Maple butter (a creamy spread) and soft maple sugar candy are two of the most popular. Maple taffy, hard block sugar and stirred (granulated) maple sugar are also available at times.

## GRADING AND LABELLING

Maple syrup sold in Ontario must be graded. Canada No. 1 maple syrup is usually intended for table use and is divided into colour classes extra light, light and medium. Lighter coloured syrup tends to be milder in flavour. Canada No. 2 Amber or Ontario Amber is a darker, stronger flavoured syrup and is considered the best for use as a cooking ingredient.

Pure maple syrup must have a sugar content of at least 66%. No additives are allowed.

The label on containers of maple syrup must bear the name of the product, the volume of syrup in the container, the grade and colour class of the syrup and the name and address of the producer or packer.

Maple syrup produced and offered for sale in Ontario must meet the grading and labelling requirements of Regulation 386 of the *Farm Products Grades and Sales Act* (available at *www.e-laws.gov.on.ca*). Maple syrup produced in Ontario but offered for sale outside of Ontario must be in compliance with the Maple Products Regulations of the *Canada Agricultural Products Act* (*http://laws.justice.gc.ca/en/c-0.4/c.r.c.-c.289/text.html*).

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